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International application number: PCT/AU04/001677

International filing date: 26 November 2004 (26.11.2004)

Document type: Certified copy of priority document

Document details: Country/Office: AU
Number: 2003906725
Filing date: 04 December 2003 (04.12.2003)

Date of receipt at the International Bureau: 22 December 2004 (22.12.2004)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)

PCT/AU2004/001677

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Patent Office
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I, LEANNE MYNOTT, MANAGER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003906725 for a patent by RAZORBACK VEHICLES CORPORATION LIMITED as filed on 04 December 2003.

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LEANNE MYNOTT
MANAGER EXAMINATION SUPPORT AND SALES

S&F Ref: 659104

AUSTRALIA

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PROVISIONAL SPECIFICATION FOR THE INVENTION ENTITLED:

A Pneumatic or Hydraulic Cylinder

Name and Address of Applicant:

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Name of Inventor:

Jeffrey Kendall

This invention is best described in the following statement:

A PNEUMATIC OR HYDRAULIC CYLINDER

Technical Field

The present invention relates to pneumatic and hydraulic cylinders and more particularly but not exclusively to hydraulic cylinders employed in motor vehicles such as that described in International Patent Applications PCT/AU01/00446, PCT/AU00/01235, PCT/AU00/00234, PCT/AU00/00065, WO 98/07591 and WO 91/14076.

Background of the Invention

Particularly described in International Patent Application PCT/AU01/00446 is a hydraulic cylinder employed in a vehicle to raise and lower the load receiving tray thereof.

In vehicles that have a load receiving tray that is moved between a raised (transport position) and a lower position facilitating the loading and unloading of materials, the tray needs to be fixed in the raised position. The cylinder of International Patent Application PCT/AU01/0046 has the object of providing a hydraulic cylinder operable to secure the tray in the raised position.

Although there is known a variety of hydraulic or pneumatic cylinders that are lockable, they frequently are expensive to manufacture and may not be reliable.

Object of the Invention

It is the object of the present invention to overcome or substantially ameliorate at least one of the above disadvantages.

Summary of the Invention

There is disclosed herein a pneumatic or hydraulic cylinder having a longitudinal axis and to be activated by a fluid under pressure, the cylinder including:

a barrel having a bore;

a piston rod slidably and sealingly located in the bore and co-operating therewith to provide a variable volume chamber into which the fluid is delivered to move the piston rod to change said volume;

a port in communication with said chamber and via which the fluid is allowed to pass;

a lock assembly mounted on the piston rod, the assembly including:

at least one lock member movable relative to said axis between a radially inner position permitting movement of the piston rod, and a radially outer position engaging the

barrel to prevent movement of the piston rod in a predetermined direction beyond a predetermined longitudinal position;

a retainer member mounted on the piston rod and movable longitudinally thereof between a first position retaining the lock member in the radially outer position, and a second position providing for movement of the lock member to the radially inner position;

means urging the retainer member to the first position thereof to thereby urge said locking member to the radially outer position; and

wherein said retainer member is exposed to the fluid in said chamber so that pressure of said fluid on said retainer member moves said retainer member to the second position thereof and therefore the lock member to the radially inner position to free said piston rod for movement in said direction.

Preferably, said retainer member is a sleeve surrounding the piston rod, said sleeve having a longitudinally extending portion which when said retainer member is in the first position is radially aligned with said lock member, thus retaining the lock member in the radially outer position.

Preferably, said lock member is spherical in configuration.

Preferably, said lock member is a first lock member, and said cylinder includes further lock members, all the lock members being spherical in configuration with the same diameter, the lock members being angularly displaced about said axis.

Preferably, said bore includes an annular ramp surface joining a first bore length to a second bore length, the first bore length having a greater radius than the second bore length, with said lock member/s engaging the first bore length to be located in the radially outer position, and engaging the second bore length to be located in the radially inner position.

Preferably, the means to urge is a spring extending between said sleeve and piston rod.

Brief Description of the Drawings

A preferred form of the present invention will now be described by way of example with reference to the accompanying drawings wherein:

Figure 1 is a schematic sectioned side elevation of a hydraulic or pneumatic cylinder; and

Figure 2 is a further schematic sectioned side elevation of the cylinder of Figure 1.

Detailed Description of the Preferred Embodiments

In the accompanying drawings there is schematically depicted a hydraulic or pneumatic cylinder 10. The cylinder 10 includes a barrel 11 providing a generally cylindrical bore 12. The bore 12 slidably receives a piston rod 13 and sealingly engages the piston rod 13 to provide a variable volume chamber 14 which receives a fluid under pressure. The fluid under pressure enters and leaves the chamber 14 via the port 15. The port 15 is formed in an end cap 16 of the barrel 11, which cap 16 sealingly closes the chamber 14.

The cylinder 10 has a longitudinal axis 17, with piston 13 moving longitudinally of the barrel 11 to change the volume 14.

The barrel 11 may have at its other end a further end cap so that a second variable volume chamber 18 is provided, the chamber 18 having associated with it a port 19. Again the chamber 18 would receive a fluid under pressure if so required. Attached to the piston rod 13 is a wear band 19 and seal 20 that sealingly connects the piston rod 13 with the bore 12.

The end cap 16 is provided with an annular skirt 21 that provides a first bore length 22 joined to a second bore length 23 by a ramp surface 24. The ramp surface 24 diminishes in radius from the length 22 to the length 23, as the length 22 has a greater radius than the length 23.

Mounted on the piston rod 13 is a lock assembly 25 that is operable to retain the piston rod 13 in the retracted position, that is in the position shown in Figure. 2. When operated the lock mechanism 25 prevents movement of the piston rod 13, to increase the volume of the chamber 14, beyond a predetermined position, the position being defined by the ramp surface 24.

The lock assembly 25 includes one or more spherical lock members 26 that are equal in diameter and located at angularly spaced locations about the axis 17. The members 26 are movable radially between an inner radial position (as shown in Figure 1) and an outer radial position (as shown in Figure 2). When in the inner position the members 26 permit movement of the piston rod 13, while in the radially outer position the members 26 prevent movement of the piston rod 13 beyond the position shown in Figure 2.

Slidably mounted on the piston rod 13 is a retainer member 27 in the form of a sleeve. The member 27 has an annular portion 28 of predetermined longitudinal length that when radially aligned with the members 26 maintains the members 26 in the radially outer position. When the portion 28 is displaced from the members 26 (as shown in Figure 2) the members are permitted to move radially inward.

The members 26 are captively located with respect to the rod 13 by means of an end flange 29.

A spring 30 extends between the member 27 and a further end flange 31 of the rod 13, to urge the member 27 to the position as shown in Figure 2, that is the position at which the member 27 is retaining the members 26 in the radially outer position. Accordingly the spring 30, via the member 27 also urges the member 26 to the radially outer position.

In operation of the above described cylinder 10 the piston rod 13 when moved in the direction of the arrow 32 by a force applied thereto, such as a fluid under pressure being delivered to the chamber 18, progresses towards the end cap 16 with the members 26 in the radially inner position. Ultimately, the members 16 engage the ramp surface 24 and move radially outward. Thereafter the retainer member 27 is moved in the direction of the arrow 32 relative to the piston rod 13 under the action of the spring 30. This movement of the member 27 moves the members 26 radially outward once they pass the ramp surface 24. The piston rod 13 is therefore locked in a position of Figure 2 as movement of the piston rod 13 in the direction of the arrow 33 is prevented by engagement of the members 26 with the ramp surface 24 and engagement of the flange 29 also with the members 26. However, upon a fluid under pressure being delivered to the chamber 14 (with the piston rod 13 in the position shown in Figure 2), the fluid under pressure moves the member 27 in the direction of the arrow 33 relative to the piston rod 13. This results in the portion 28 moving from a position between the members 26 and the piston rod 13 so that the members 26 can move radially inward, thereby permitting movement of the piston rod 13.

Dated 4 December, 2003

Razorback Vehicles Corporation Limited

Patent Attorneys for the Applicant/Nominated Person

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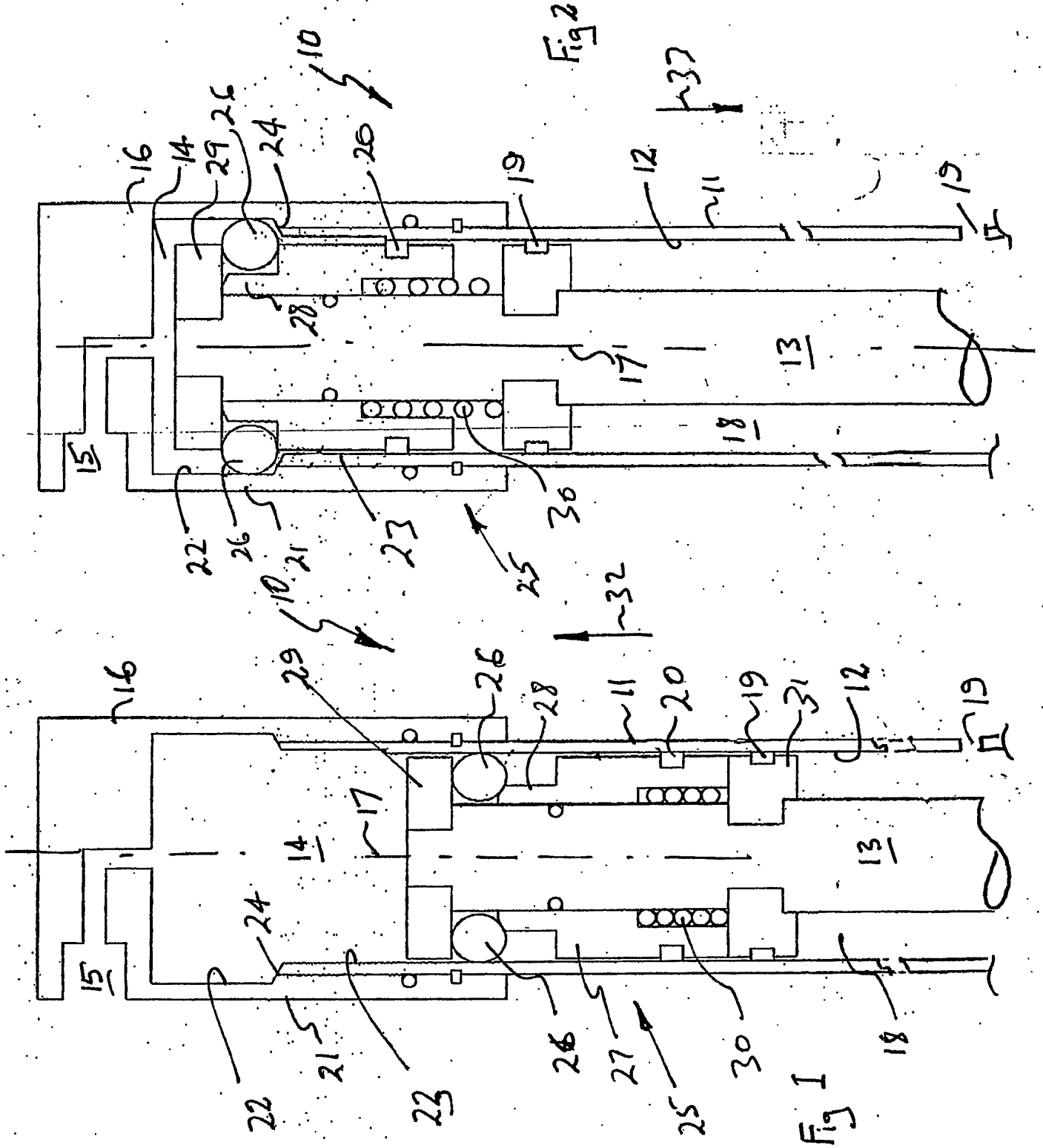
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Fig 2

Fig 1